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COMPLETE SPECIFICATION

ELECTRICAL FITTING

We, **TARGETTI NZ LIMITED**, a New Zealand company of 60 Parnell Road, Parnell, Auckland, New Zealand, do hereby declare this invention, for which We pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to electrical fittings and, in particular, although not necessarily solely, electrical fittings for fitment to fire separating apparatus such as fire rated walls and ceilings.

The invention may be particularly relevant to the provision of electrical fittings such as recessed lights, switch boxes and other such fittings mounted in the wall of a building.

Many building codes internationally require the provision of fire separating walls and ceilings throughout a building. Such fire separation is generally provided by fire rated cladding to the wall or ceiling. However, when electrical apparatus such as power points and recessed lights are fitted in such a fire rated wall or ceiling, it is necessary to break the integrity of the cladding for the fitment of the electrical apparatus. This is particularly the case in apparatus such as recessed lights.

To comply with the building codes and to ensure the integrity of the fire separation apparatus, it is normal to provide such recessed lights with a fire rated box about the rear of the light fitting generally constructed from the same materials as the fire rated ceiling itself. The construction of these fire rated boxes about the fittings greatly increases the cost of providing recessed lighting to a building.

Therefore, it is an object of the present invention to provide an electrical fitting capable of fitment in a fire rated wall or ceiling which will provide a level of fire separation itself to overcome some of the disadvantages of the prior art and/or at least provide the public with a useful choice.

Accordingly, in a first aspect, the invention consist in an electrical fitting for fitment to a fire rated wall or ceiling including:

a housing for electrical apparatus, the housing including a flange adapted to reside adjacent the wall or ceiling and to allow the fitting to be recessed into the wall or ceiling; and

a layer of ceramic material included in said housing.

Further aspects of this invention may become apparent to those skilled in the art when reading the following description which will now be provided with reference to the following drawings in which:

Figure 1 is a partial cross sectional elevation through a recessed light housing being one embodiment of the apparatus;

Figure 2 is a cross partial sectional elevation through an alternative housing for a recessed light being a further embodiment of the apparatus;

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Figure 3 is a cross sectional elevation through a housing for a recessed light being a yet further embodiment of the apparatus;

Figure 4 is a front elevational view of a housing being a flush box and being a further embodiment of the apparatus;

Figure 5 is a side elevational view of the flush box of Figure 4;

Figure 6 is a plan view of the flush box of Figure 4; and

Figure 7 is an elevational view of plugs used in conjunction with the flush box of Figures 4 through 6.

Referring to the drawings, one embodiment of the invention as shown in Figure 1 in which the electrical device comprises a light fitting and, in particular, a recessed light fitting for fitment within ceiling cavities.

The light fitting 1 comprises a housing 2 made from a fire rated material being a ceramic or porcelain housing. Although other materials may be used as layers inside or outside of the housing 2, at least one fire rated layer of ceramic is included in the housing 2.

The housing 2 has a throat portion 3 for fitment inside an aperture 11 made in a ceiling or wall or similar such fire separation surface together with a flange 4 being an outwardly turned flange to rest adjacent the ceiling or wall panel 12 in which the aperture 11 is provided.

In this particular embodiment, a series of apertures such as apertures for cables 5, a mounting hole 6 and apertures 7 for the fixing of the lamp holder are provided in the housing 2. In such a ceramic housing, any large apertures will allow the transmission of heat, smoke or fire and, therefore, it is important to minimise the size of the apertures provided in the housing 2. Apertures such as those provided are preferably less than 5 millimetres in diameter and, more preferably, in the range of 2 to 4 millimetres in diameter.

To assist in the minimisation of the apertures, an incoming electrical feed may be provided with the phase and neutral wiring being provided through separate apertures 5 or together if the cable is of small cross-section. Due to the insulating nature of the housing 2, no earth need be provided to the lamp holder 32. The provision of separate apertures for the phase and neutral allow for cable holes in the order of 2 or 3 millimetres to be used as opposed to the much larger apertures in normal light fittings.

In a down light or recessed light as shown in Figure 1, it has been found that the ceramic housing of less than 3 millimetres thickness is sufficient to provide the necessary structural integrity to the fitting as a whole. Lesser diameter housings could be used if desired.

To assist in the fitment of such a housing, a spring clip 8 may be accommodated in a specially indented slot 9 as shown in Figure 3 provided in the outer circumference of the housing 2. The spring clip 8 may rest in the slot 9 and a distil end 10 of the spring clip 8 may rest against the rear of the ceiling panel 12 adjacent the flange 4. The end of the spring clip 10 and the flange 4 will be provided on opposed sides of the ceiling panel. In the preferred form shown in Figure 1, the spring clip may be provided with an alternative fitting such as an aperture 33 for the fitment of a screw, bolt, rivet or plug 34 into the housing 2.

If fitted with a spring clip 8 as suggested, the high temperatures produced during a fire may cause weakening of the spring clip 8 and risk the slipping of the housing 2 through the aperture in which it is fitted and allowing the passage of smoke, etc. into the ceiling cavity about the loose housing 2. Therefore, the preferred form of this invention provides a sealant 11

on the side of the flange 4 and also, preferably, about the throat 3 of the housing 2. This sealant may be used to ensure a tight seal even with other connectors being used and should be a fire rated sealant.

In the preferred form, the sealant may comprise an intumescent fire resistent fibre strip (PALUSOL) or equivalent. Such a material when heated will expand and seal around the aperture in the ceiling to inhibit the passage of smoke or fire about the housing 2. Furthermore, under heat such a sealant will expand to assist in locking the light fitting into the ceiling aperture in the case of fire. This may become important should the normal mounting such as the spring clip 8 fail in fire conditions.

Alternative sealants may be used and may be installed with the use of a sealant gun during fitting. However, these would require replacement should the housing 2 require temporary removal from its aperture for replacement or maintenance or other such purposes. The intumescent fire resistent strip provided about the ceramic flange 4 provides the necessary sealant and can be attached to the flange 4 so that it is removable with the fitting as a whole. Some sealants may require attaching to the ceramic flange 4 or throat 3 with a high temperature glue if necessary.

To assist in the connection of the housing 2 through an aperture in a ceiling or similar such fire resistent surface, a washer or other bearing surface may need to be provided between the end 10 of the spring clip 8 and the ceiling panel itself to provide a larger bearing area. This may be particularly important to avoid localised failure of the ceiling panel in fire conditions allowing the light fitting to displace from the aperture. Alternatively, the end 10 of the clip 8 may itself be provided with a greater bearing surface for resting against the panel 12.

A baffle design 14 as shown in part elevation in Figure 1 may be provided around the interior surface 12 of the housing 2.

It should be noted that a further aperture 6 is provided in the housing 2 for the mounting of a connector or similar device 36 to the exterior of the housing 2 which may act as the separation point for the cables from the normal electrical cable into the split cable configuration to suit the apertures 5 in the housing 2.

In Figure 2, a further embodiment of a housing and electrical fitting as shown which again comprises a housing 2 for a recessed down light. In this example, a connection means 36 is provided in an alternative

position to that of the previous embodiment. In this example, the ceramic housing 2 is of slightly different configuration as can be seen in the drawings.

Referring to Figures 4, 5 and 6, a further housing 2 may be provided which, in this instance, provides a flush box for fitting in wall cavities and the like. As with the previous embodiments, the housing 2 is provided in a ceramic material with minimal diameter apertures provided to limit the ability of smoke or fire to pass through available apertures in the housing 2. As can be seen in this preferred embodiment, the flush box housing 2 may have fitment apertures 18 for attachment to the wall panelling or similar as well as a variety of other apertures 19 for the connection of the housing 2 to studs or similar such construction members. In addition, a number of further apertures 20 may be provided to allow the passage of single cables into the housing 2. Again, it is preferred that the flush box housing 2 provides apertures to accommodate each of the phase, neutral and earth as necessary rather than a larger aperture to take the combined cable.

As shown in Figure 7, plugs 21 may be provided to close those apertures not being used by cables or fitment apparatus such as screws, nails or bolts.

As with the previous housings, all apertures are in the preferred range of 2 millimetres to 4 millimetres in diameter.

Thus it can be seen that the provision of a ceramic housing allows for the fitment of recessed lighting such as down lights into a fire resistent wall or ceiling without the need to create a fire proof box around the outside of the housing. The ceramic housing itself may be fired at temperatures in excess of 1000°C and, therefore, will have a repeat temperature tolerance suitable for fire rated apparatus.

The housing 2 may be used in conjunction with special high temperature insulated wiring so as to provide an entirely fire rated device. The ordinary electrical wiring may be clipped well clear of the ceramic housing before being connected to the special temperature insulated wiring.

The minimisation of aperture sizes in the housing reduces the passage of smoke or fire through the housing. In the case of housings for down lights, the minimisation of apertures is quite a departure from conventional lighting fittings. Such fittings generally have large apertures to allow the passage of air through the light fitting to cool the fitting itself. An increase in temperature of the fitting during normal usage decreases the life of light bulbs or similar such

apparatus provided within the housing 2. It has been found that the ceramic housings 2 of this preferred form of the invention allow for sufficient dissipation of heat for reasonable performance of the fittings provided within the housing 2 even without the normal large apertures provided in the rear of such housings.

Thus it can be seen that the invention provides for electrical devices including housings which may be fitted to fire separating walls and ceilings and provide fire separation without the expensive construction of fire rated boxes about the fittings.

Where in the foregoing description, reference has been made to specific components or integers of the invention having known equivalents, then such equivalents are herein incorporated as if individually set forth.

Although this invention has been described by way of example and with reference to possible embodiments thereof, it is to be understood that modifications or improvements may be made thereto without departing from the scope of the invention as defined in the appended claims.

WHAT WE CLAIM IS:

1. An electrical fitting for fitment to a fire rated wall or ceiling including:

a housing for electrical apparatus, the housing including a flange adapted to reside adjacent the wall or ceiling and to allow the fitting to be recessed into the wall or ceiling; and

a layer of ceramic material included in the housing.

2. An electrical fitting as claimed in claim 1 wherein the housing is completely formed of a ceramic material.

3. An electrical fitting as claimed in claim 1 or claim 2 wherein said ceramic material comprises porcelain.

4. An electrical fitting as claimed in any one of the previous claims wherein the wall or ceiling includes a cladding and wherein the housing includes a main body portion adapted to protrude through an aperture in the cladding to house electrical apparatus within the cavity behind the cladding.

5. An electrical fi ng as claimed in claim 4 wherein said housing includes an opening at an end of the housing adjacent said cladding.

6. An electrical fitting as claimed in claim 5 wherein the housing includes a throat portion within the aperture in the cladding, and the flange is an outwardly turned flange adjacent the throat portion and distil from the main body portion.

7. An electrical fitting as claimed in claim 6 wherein a fire rated sealant is provided on a side of the flange to reside against the cladding.

8. An electrical fitting as claimed in claim 7 wherein the fire rated sealant comprises an intumescent fire resistent fibre strip about the flange.

9. An electrical fitting as claimed in claim 7 wherein the sealant is an elastic sealant fitted by a sealant gun.

10. An electrical fitting as claimed in any one of the preceding claims wherein the housing includes apertures for the passage of wires into the housing.

11. An electrical fitting as claimed in claim 10 wherein the apertures are less than 5 millimetres in diameter.

12. An electrical fitting as claimed in any one of claims 6 to 9 wherein the apparatus is provided with retaining means fitted or engageable with the housing and engaged to or against the cladding on a distil side of the cladding from the flange.

13. An electrical fitting as claimed in any one of the preceding claims wherein the apparatus comprises a housing for a recessed light.

14. An electrical fitting as claimed in any one of claims 1 to 13 wherein the housing comprises a flush box.

15. An electrical fitting substantially as hereinbefore described with particular reference to any one of the accompanying drawings.

TARGETTI N.Z. LIMITED
by their attorneys
BALDWIN, SON & CAREY

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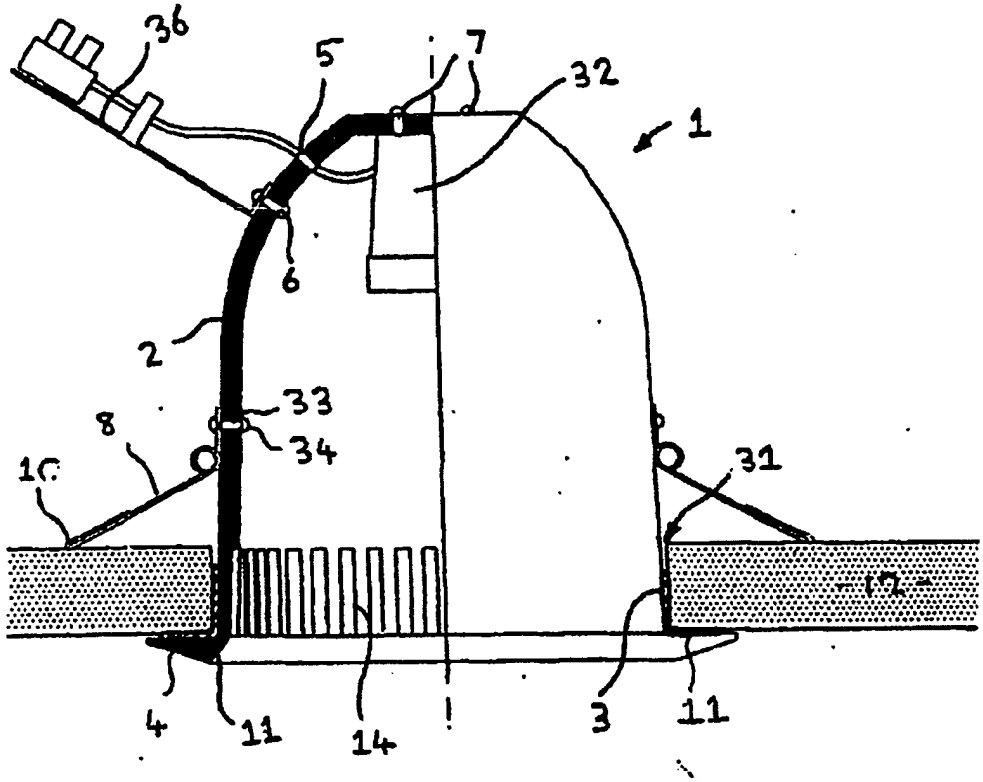

FIGURE 1

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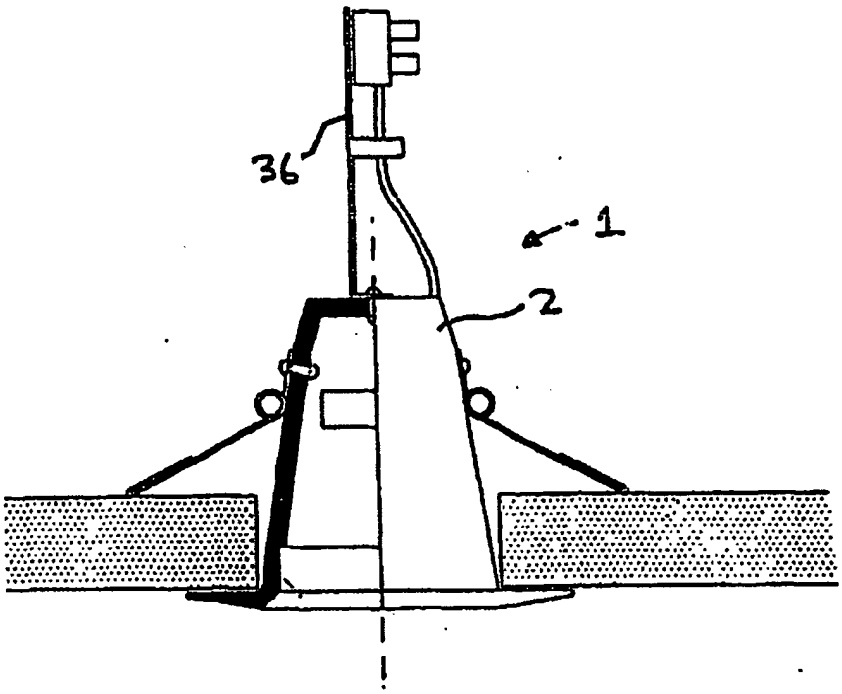

FIGURE 2

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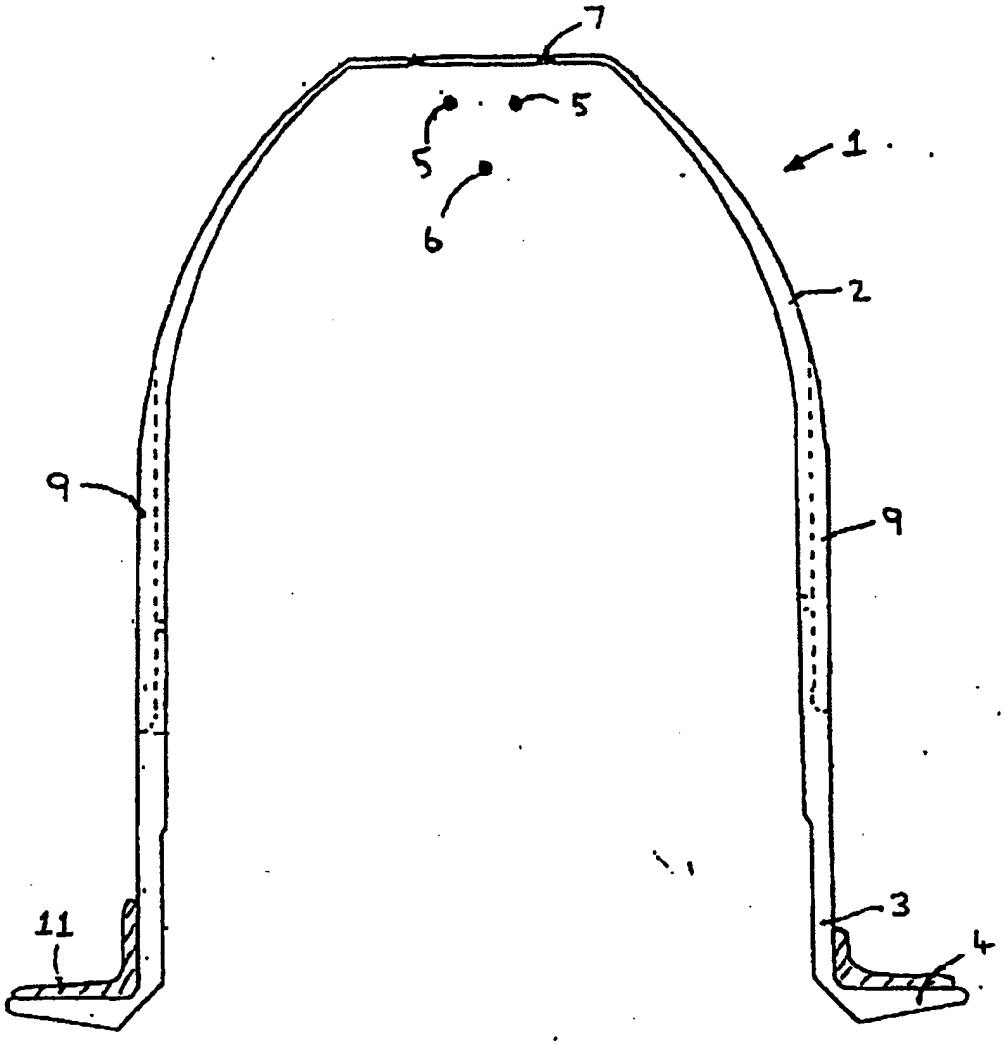

FIGURE 3

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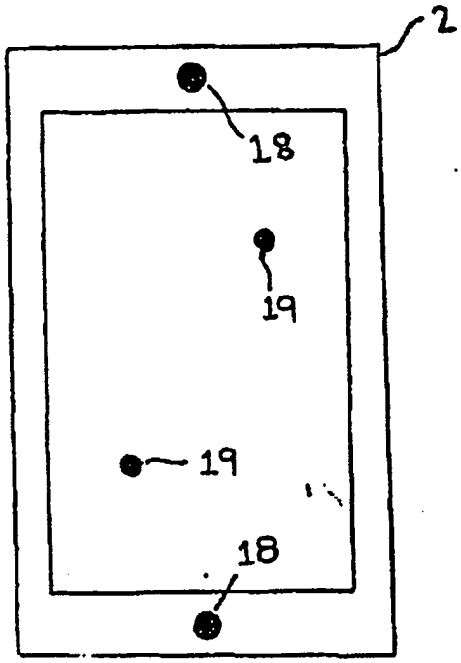

FIGURE 4

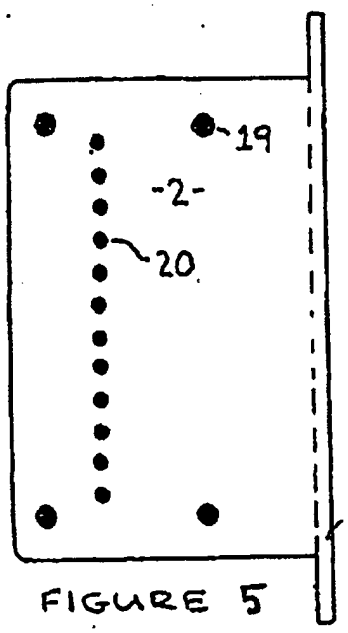

FIGURE 5

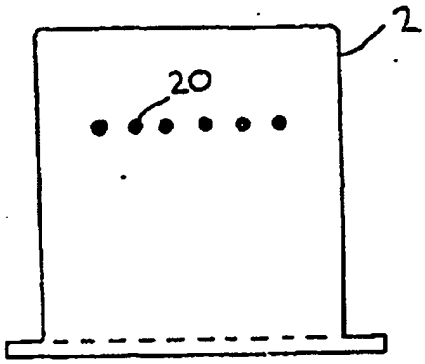

FIGURE 6

FIGURE 7

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